# Enhanced Interregional Transaction Coordination: *Pricing Concept Update*

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# Agenda

- ◆ Previous discussions on this topic centered around pricing formulas

- ◆ Market participants requested greater clarity by way of examples

- ◆ This presentation provides real-time market pricing rule examples for:

  - ▪ *Proxy Generator Buses*

  - ▪ *For Proxy Generator Buses when special rules apply*

  - ▪ *Non-Competitive Proxy Generator Buses*

# Refresher – RTM Pricing Rules

- All transactions will settle using the RTD LBMPs unless the RTC that schedules transactions on an hourly or 15 minute basis have binding 'Proxy Generator Bus Constraints'

- When RTC has binding 'Proxy Generator Bus Constraint', the rules described on the following slides will be used to determine the Real-Time LBMPs at the external proxy buses

- Existing price determination logic is predicated on only $RTC_{15}$ being able to quantify congestion at the external proxy buses

- With more frequent transaction scheduling, the price determination logic needed to be expanded to reflect capability of subsequent RTC and RTD evaluations to quantify congestion at the external proxy buses while scheduling intra-hour transactions

- The RTC hourly LBMP averaging will be disabled for all external Proxy Generator Buses
  - Today, the NYISO schedules transactions hourly using $RTC_{15}$ LBMPs for four 15 minute intervals in that hour averaged into one RTC LBMP for that hour
  - This was to reflect the top of the hour ramp constraints throughout the hour

- Binding Proxy Generator Bus Constraints include:
  - NYCA Ramp Limited
  - Proxy Generator Bus TTC Limited
  - Proxy Generator Bus Ramp Limited

# RTM Pricing Example

All transactions will settle using the RTD LBMPs unless the RTC that schedules transactions on an hourly or 15 minute basis have binding 'Proxy Generator Bus Constraints'

(Example)

Any Proxy Generator Bus without any constraints.

| LBMPs | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SCUC | $ 30 | | | | | | | | | | | |
| RTC15 | $ 32 | | $ 36 | | $ 41 | | $ 37 | | | | | |
| Rolling RTC | $ 40 | | $ 42 | | $ 37 | | $ 45 | | | | | |
| RTD | $ 60 | $ 55 | $ 38 | $ 36 | $ 39 | $ 37 | $ 35 | $ 33 | $ 40 | $ 42 | $ 38 | $ 30 |

| External Constraints | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| RTC15 | None | | | None | | | None | | | None | | |
| Rolling RTC | None | | | None | | | None | | | None | | |
| RTD | None | None | None | None | None | None | None | None | None | None | None | None |

| RT LBMPs | $ 60 | $ 55 | $ 38 | $ 36 | $ 39 | $ 37 | $ 35 | $ 33 | $ 40 | $ 42 | $ 38 | $ 30 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|

'Rolling RTC,' also known as 'Subsequent RTC,' is defined as the RTC that schedules 15 minute transactions, once the hourly transactions have been scheduled

# RTM Pricing – Proxy Pricing Rules

Pricing Rules for Proxy Generator Buses:

- The rules below apply for determining Real-Time LBMPs at the Bruce, Keystone, Sandy Pond and 1385 Proxy Generator Buses

- When transactions at a Proxy Generator Bus are authorized to be scheduled hourly only, and $RTC_{15}$ has a binding Proxy Generator Bus Constraint:
  - Replace the RTD LBMPs with the $RTC_{15}$ LBMPs for the hour

- When transactions at a Proxy Generator Bus are authorized to be scheduled on a 15 minute basis, where the $RTC_{15}$ that schedules hourly transactions was not constrained and the RTC that schedules 15 minute transactions has a binding Proxy Generator Bus Constraint:
  - Replace the RTD LBMPs with the RTC LBMPs for the 15 minute period(s) that RTC is constrained

- When transactions at a Proxy Generator Bus are authorized to be scheduled on a 15 minute basis, and
  - $RTC_{15}$ (that schedules hourly transactions) and RTC (that schedules 15 minute transactions) have the same binding Proxy Generator Bus Constraint in the import direction:
    - *RT LBMP = Max($RTC_{15}$ LBMP, Subsequent RTC LBMP*)   *defined below*
  - $RTC_{15}$ and RTC have the same binding Proxy Generator Bus Constraint in the export direction:
    - *RT LBMP = Min($RTC_{15}$ LBMP, Subsequent RTC LBMP)*
  - Replace the RTD LBMPs with the RTC LBMPs for the period that RTC is constrained

RTC15 is defined as the RTC that schedules hourly transactions

'Subsequent RTC', also known as 'Rolling RTC', is defined as the RTC that schedules 15 minute transactions, once the hourly transactions have been scheduled

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# RTM Pricing – Proxy Pricing Examples

## Pricing Rules for Proxy Generator Buses (Examples):

- When transactions at a Proxy Generator Bus are authorized to be scheduled hourly only

**When transactions at a Proxy Generator Bus are authorized to be scheduled hourly only, and RTC15 has a binding Proxy Generator Bus Constraint in the import direction.**

**RT LBMP = RTC15 LBMP**

| LBMPs | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SCUC | $ 30 | | | | | | | | | | | |
| RTC15 | $ 20 | | | $ 36 | | | $ 41 | | | $ 37 | | |
| Rolling RTC | $ 40 | | | $ 42 | | | $ 37 | | | $ 45 | | |
| RTD | $ 60 | $ 55 | $ 38 | $ 36 | $ 39 | $ 37 | $ 35 | $ 33 | $ 40 | $ 42 | $ 38 | $ 30 |

| External Constraints | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| RTC15 | **Constraint** | | | **Constraint** | | | **Constraint** | | | **Constraint** | | |
| Rolling RTC | None | | | None | | | None | | | None | | |
| RTD | None | None | None | None | None | None | None | None | None | None | None | None |

| RT LBMPs | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| RT LBMPs | $ 20 | $ 20 | $ 20 | $ 36 | $ 36 | $ 36 | $ 41 | $ 41 | $ 41 | $ 37 | $ 37 | $ 37 |

**When transactions at a Proxy Generator Bus are authorized to be scheduled hourly only, and RTC15 has a binding Proxy Generator Bus Constraint in the export direction.**

**RT LBMP = RTC15 LBMP**

| LBMPs | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SCUC | $ 30 | | | | | | | | | | | |
| RTC15 | $ 45 | | | $ 36 | | | $ 41 | | | $ 37 | | |
| Rolling RTC | $ 40 | | | $ 42 | | | $ 37 | | | $ 45 | | |
| RTD | $ 60 | $ 55 | $ 38 | $ 36 | $ 39 | $ 37 | $ 35 | $ 33 | $ 40 | $ 42 | $ 38 | $ 30 |

| External Constraints | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| RTC15 | **Constraint** | | | **Constraint** | | | **Constraint** | | | **Constraint** | | |
| Rolling RTC | None | | | None | | | None | | | None | | |
| RTD | None | None | None | None | None | None | None | None | None | None | None | None |

| RT LBMPs | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| RT LBMPs | $ 45 | $ 45 | $ 45 | $ 36 | $ 36 | $ 36 | $ 41 | $ 41 | $ 41 | $ 37 | $ 37 | $ 37 |

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# RTM Pricing – Proxy Pricing Examples

Pricing Rules for Proxy Generator Buses (Examples):

- When transactions at a Proxy Generator Bus are authorized to be scheduled on a 15 minute basis

When transactions at a Proxy Generator Bus are authorized to be scheduled on a 15 minute basis, where the RTC15 that schedules hourly transactions was not constrained and the RTC that schedules 15 minute transactions has a binding Proxy Generator Bus Constraint in the import direction.

RT LBMP = Rolling RTC LBMP

| LBMPs | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SCUC | $ 30 | | | | | | | | | | | |
| RTC15 | $ 32 | | | $ 36 | | | $ 34 | | | $ 37 | | |
| Rolling RTC | $ 40 | | | $ 42 | | | $ 30 | | | $ 45 | | |
| RTD | $ 60 | $ 55 | $ 38 | $ 36 | $ 39 | $ 37 | $ 35 | $ 33 | $ 40 | $ 42 | $ 38 | $ 30 |

| External Constraints | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| RTC15 | None | | | None | | | None | | | None | | |
| Rolling RTC | None | | | None | | | **Constraint** | | | None | | |
| RTD | None | None | None | None | None | None | None | None | None | None | None | None |

| RT LBMPs | $ 60 | $ 55 | $ 38 | $ 36 | $ 39 | $ 37 | $ 30 | $ 30 | $ 30 | $ 42 | $ 38 | $ 30 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|

When transactions at a Proxy Generator Bus are authorized to be scheduled on a 15 minute basis, where the RTC15 that schedules hourly transactions was not constrained and the RTC that schedules 15 minute transactions has a binding Proxy Generator Bus Constraint in the export direction.

RT LBMP = Rolling RTC LBMP

| LBMPs | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SCUC | $ 30 | | | | | | | | | | | |
| RTC15 | $ 32 | | | $ 36 | | | $ 34 | | | $ 37 | | |
| Rolling RTC | $ 40 | | | $ 42 | | | $ 49 | | | $ 45 | | |
| RTD | $ 60 | $ 55 | $ 38 | $ 36 | $ 39 | $ 37 | $ 35 | $ 33 | $ 40 | $ 42 | $ 38 | $ 30 |

| External Constraints | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| RTC15 | None | | | None | | | None | | | None | | |
| Rolling RTC | None | | | None | | | **Constraint** | | | None | | |
| RTD | None | None | None | None | None | None | None | None | None | None | None | None |

| RT LBMPs | $ 60 | $ 55 | $ 38 | $ 36 | $ 39 | $ 37 | $ 49 | $ 49 | $ 49 | $ 42 | $ 38 | $ 30 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|

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# RTM Pricing – Proxy Pricing Examples

Pricing Rules for Proxy Generator Buses (Examples):

- ◆ When transactions at a Proxy Generator Bus are authorized to be scheduled on a 15 minute basis

**When transactions at a Proxy Generator Bus are authorized to be scheduled on a 15 minute basis, and RTC15 (that schedules hourly transactions) and RTC (that schedules 15 minute transactions) have the same binding Proxy Generator Bus Constraint in the import direction:**

**RT LBMP = Max(RTC15 LBMP, Rolling RTC LBMP)**

| LBMPs | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SCUC | $ 30 | | | | | | | | | | | |
| RTC15 | $ 32 | | $ 36 | | | $ 34 | | | $ 37 | | | |
| Rolling RTC | $ 40 | | $ 42 | | | $ 30 | | | $ 45 | | | |
| RTD | $ 60 | $ 55 | $ 38 | $ 36 | $ 39 | $ 37 | $ 35 | $ 33 | $ 40 | $ 42 | $ 38 | $ 30 |

| External Constraints | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| RTC15 | None | | | None | | | **Constraint** | | | None | | |
| Rolling RTC | None | | | None | | | **Constraint** | | | None | | |
| RTD | None | None | None | None | None | None | None | None | None | None | None | None |

| RT LBMPs | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | $ 60 | $ 55 | $ 38 | $ 36 | $ 39 | $ 37 | $ 34 | $ 34 | $ 34 | $ 42 | $ 38 | $ 30 |

**When transactions at a Proxy Generator Bus are authorized to be scheduled on a 15 minute basis, and RTC15 and RTC have the same binding Proxy Generator Bus Constraint in the export direction:**

**RT LBMP = Min(RTC15 LBMP, Rolling RTC LBMP)**

| LBMPs | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SCUC | $ 30 | | | | | | | | | | | |
| RTC15 | $ 32 | | $ 36 | | | $ 34 | | | $ 37 | | | |
| Rolling RTC | $ 40 | | $ 42 | | | $ 49 | | | $ 45 | | | |
| RTD | $ 60 | $ 55 | $ 38 | $ 36 | $ 39 | $ 37 | $ 35 | $ 33 | $ 40 | $ 42 | $ 38 | $ 30 |

| External Constraints | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| RTC15 | None | | | None | | | **Constraint** | | | None | | |
| Rolling RTC | None | | | None | | | **Constraint** | | | None | | |
| RTD | None | None | None | None | None | None | None | None | None | None | None | None |

| RT LBMPs | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | $ 60 | $ 55 | $ 38 | $ 36 | $ 39 | $ 37 | $ 34 | $ 34 | $ 34 | $ 42 | $ 38 | $ 30 |

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# RTM Pricing – Special Pricing Rules

Pricing Rules for Scheduled Lines and Transactions are authorized to be scheduled hourly only:

- ◆ The rules below apply for determining Real-Time LBMPs at the CSC, Linden VFT and Neptune Proxy Generator Buses

- ◆ When transactions for a Scheduled Line are authorized to be scheduled hourly only, and
  - ▪ $RTC_{15}$ has binding Proxy Generator Bus Constraints in the import direction:
    - *Max($RTC_{15}$ LBMP, Min(unconstrained RTD LBMP, 0)*
  - ▪ $RTC_{15}$ has binding Proxy Generator Bus Constraints in the export direction:
    - *Min($RTC_{15}$ LBMP, Max(unconstrained RTD LBMP, SCUC LBMP)*
  - ▪ NYCA Ramp Constraints are excluded from this rule

- ◆ The 'unconstrained RTD LBMP' is defined as the RTD LBMP for the Scheduled Line with all congestion from the Scheduled Line Constraints removed
  - ▪ The 'unconstrained RTD LBMP' for the Scheduled Line may have congestion from internal constraints still reflected in it

# RTM Pricing – Special Pricing Examples

Pricing Rules for Scheduled Lines (Examples):

◆ When transactions for a Scheduled Line are authorized to be scheduled hourly only

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When transactions for a Scheduled Line are authorized to be scheduled hourly only, and RTC15 has binding Proxy Generator Bus Constraints in the import direction:

RT LBMP = Max(RTC15 LBMP, Min(unconstrained RTD LBMP, 0)

| | | | LBMPs | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SCUC | $ 30 | | | | | | | | | | | |
| RTC15 | $ 20 | | | $ 36 | | | $ (5) | | | $ 37 | | |
| Rolling RTC | $ 40 | | | $ 42 | | | $ 37 | | | $ 45 | | |
| RTD | $ 60 | $ 55 | $ 38 | $ 36 | $ 39 | $ 37 | $ 35 | $ (3) | $ 40 | $ 42 | $ 38 | $ 30 |
| Unconst RTD | $ 60 | $ 55 | $ 38 | $ 36 | $ 39 | $ 37 | $ 35 | $ (3) | $ 40 | $ 42 | $ 38 | $ 30 |

| | | | External Constraints | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| RTC15 | Constraint | | | Constraint | | | Constraint | | | Constraint | | |
| Rolling RTC | None | | | None | | | None | | | None | | |
| RTD | None | None | None | None | None | None | None | None | None | None | None | None |

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| RT LBMPs | $ 20 | $ 20 | $ 20 | $ 36 | $ 36 | $ 36 | $ - | $ (3) | $ - | $ 37 | $ 37 | $ 37 |

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When transactions for a Scheduled Line are authorized to be scheduled hourly only, and RTC15 has binding Proxy Generator Bus Constraints in the export direction:

RT LBMP = Min(RTC15 LBMP, Max(unconstrained RTD LBMP, SCUC LBMP)

| | | | LBMPs | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SCUC | $ 30 | | | | | | | | | | | |
| RTC15 | $ 45 | | | $ 36 | | | $ 41 | | | $ 37 | | |
| Rolling RTC | $ 40 | | | $ 42 | | | $ 37 | | | $ 45 | | |
| RTD | $ 60 | $ 55 | $ 38 | $ 36 | $ 39 | $ 37 | $ 35 | $ 20 | $ 40 | $ 42 | $ 38 | $ 30 |
| Unconst RTD | $ 60 | $ 55 | $ 38 | $ 36 | $ 39 | $ 37 | $ 35 | $ 20 | $ 45 | $ 42 | $ 38 | $ 30 |

| | | | External Constraints | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| RTC15 | Constraint | | | Constraint | | | Constraint | | | Constraint | | |
| Rolling RTC | None | | | None | | | None | | | None | | |
| RTD | None | None | None | None | None | None | None | None | None | None | None | None |

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| RT LBMPs | $ 45 | $ 45 | $ 38 | $ 36 | $ 36 | $ 36 | $ 35 | $ 30 | $ 41 | $ 37 | $ 37 | $ 30 |

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# RTM Pricing – Special Pricing Rules

Pricing Rules for Scheduled Lines and Transactions are authorized to be scheduled on a 15 minute basis:

- The rules below apply for determining Real-Time LBMPs at the CSC, Linden VFT and Neptune Proxy Generator Buses
- When transactions for a Scheduled Line are authorized to be scheduled on a 15 minute basis, where the $RTC_{15}$ that schedules hourly transactions was not constrained and
  - RTC that schedules 15 minute transactions has binding Proxy Generator Bus Constraints in the import direction

    *Max(RTC LBMP, Min(unconstrained RTD LBMP, 0))*
  - RTC that schedules 15 minute transactions has binding Proxy Generator Bus Constraints in the export direction

    *Min(RTC LBMP, Max(unconstrained RTD LBMP, SCUC LBMP))*
  - NYCA Ramp Constraints are excluded from this rule
- When transactions for a Scheduled Line are authorized to be scheduled on a 15 minute basis, and
  - $RTC_{15}$ (that schedules hourly transactions) and RTC (that schedules 15 minute transactions) have the same binding Proxy Generator Bus Constraint in the import direction:

  *Max(Max($RTC_{15}$ LBMP, Subsequent RTC LBMP), Min(unconstrained RTD LBMP, 0))*
  - $RTC_{15}$ and RTC have the same binding Proxy Generator Bus Constraint in the export direction:

  *Min(Min($RTC_{15}$ LBMP, Subsequent RTC LBMP), Max(unconstrained RTD LBMP, SCUC LBMP))*

# RTM Pricing – Special Pricing Examples

## Pricing Rules for Scheduled Lines (Examples):

- When transactions for a Scheduled Line are authorized to be scheduled on a 15 minute basis

**When transactions at any Proxy Generator Bus are authorized to be scheduled on a 15 minute basis, where the RTC15 that schedules hourly transactions was not constrained and RTC that schedules 15 minute transactions has binding Proxy Generator Bus Constraints in the import direction**

RT LBMP = Max(RTC LBMP, Min(unconstrained RTD LBMP, 0))

| LBMPs | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SCUC | $ 30 | | | | | | | | | | | |
| RTC15 | $ 32 | | | $ 36 | | | $ 34 | | | $ 37 | | |
| Rolling RTC | $ 40 | | | $ 42 | | | $ (800) | | | $ 45 | | |
| RTD | $ 60 | $ 55 | $ 38 | $ 36 | $ 39 | $ 37 | $ 35 | $(100) | $ (14) | $ 42 | $ 38 | $ 30 |
| Unconst RTD | $ 60 | $ 55 | $ 38 | $ 36 | $ 39 | $ 37 | $ 35 | $(100) | $ (14) | $ 42 | $ 38 | $ 30 |

| External Constraints | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| RTC15 | None | | | None | | | None | | | None | | |
| Rolling RTC | None | | | None | | | **Constraint** | | | None | | |
| RTD | None | None | None | None | None | None | None | None | None | None | None | None |

| RT LBMPs | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | $ 60 | $ 55 | $ 38 | $ 36 | $ 39 | $ 37 | $ - | $(100) | $ (14) | $ 42 | $ 38 | $ 30 |

**When transactions at any Proxy Generator Bus are authorized to be scheduled on a 15 minute basis, where the RTC15 that schedules hourly transactions was not constrained and RTC that schedules 15 minute transactions has binding Proxy Generator Bus Constraints in the export direction**

RT LBMP = Min(RTC LBMP, Max(unconstrained RTD LBMP, SCUC LBMP))

| LBMPs | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SCUC | $ 30 | | | | | | | | | | | |
| RTC15 | $ 32 | | | $ 36 | | | $ 34 | | | $ 37 | | |
| Rolling RTC | $ 40 | | | $ 42 | | | 800 | | | $ 45 | | |
| RTD | $ 60 | $ 55 | $ 38 | $ 36 | $ 39 | $ 37 | $ 35 | $ 20 | $ 50 | $ 42 | $ 38 | $ 30 |
| Unconst RTD | $ 60 | $ 55 | $ 38 | $ 36 | $ 39 | $ 37 | $ 35 | $ 20 | $ 50 | $ 42 | $ 38 | $ 30 |

| External Constraints | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| RTC15 | None | | | None | | | None | | | None | | |
| Rolling RTC | None | | | None | | | **Constraint** | | | None | | |
| RTD | None | None | None | None | None | None | None | None | None | None | None | None |

| RT LBMPs | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | $ 60 | $ 55 | $ 38 | $ 36 | $ 39 | $ 37 | $ 35 | $ 30 | $ 50 | $ 42 | $ 38 | $ 30 |

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## Pricing Rules for Scheduled Lines (Examples):

♦ When transactions for a Scheduled Line are authorized to be scheduled on a 15 minute basis

**When transactions for a Scheduled Line are authorized to be scheduled on a 15 minute basis, and RTC15 (that schedules hourly transactions) and RTC (that schedules 15 minute transactions) have the same binding Proxy Generator Bus Constraint in the import direction:**

RT LBMP = Max(Max(RTC15 LBMP, Rolling RTC LBMP), Min(unconstrained RTD LBMP, 0))

| LBMPs | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SCUC | $ 30 | | | | | | | | | | | |
| RTC15 | $ 32 | | $ 36 | | $ 34 | | $ 37 | | | | | |
| Rolling RTC | $ 40 | | $ 42 | | $ 30 | | $ 45 | | | | | |
| RTD | $ 60 | $ 55 | $ 38 | $ 36 | $ 39 | $ 37 | $ 35 | $ (10) | $ 40 | $ 42 | $ 38 | $ 30 |
| Unconst RTD | $ 60 | $ 55 | $ 38 | $ 36 | $ 39 | $ 37 | $ 35 | $ (10) | $ 40 | $ 42 | $ 38 | $ 30 |

| External Constraints | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| RTC15 | None | | | None | | | **Constraint** | | | None | | |
| Rolling RTC | None | | | None | | | **Constraint** | | | None | | |
| RTD | None | None | None | None | None | None | None | None | None | None | None | None |

| RT LBMPs | $ 60 | $ 55 | $ 38 | $ 36 | $ 39 | $ 37 | $ 35 | $ 34 | $ 40 | $ 42 | $ 38 | $ 30 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|

**When transactions for a Scheduled Line are authorized to be scheduled on a 15 minute basis, and RTC15 and RTC have the same binding Proxy Generator Bus Constraint in the export direction:**

RT LBMP = Min(Min(RTC15 LBMP, Rolling RTC LBMP), Max(unconstrained RTD LBMP, SCUC LBMP))

| LBMPs | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SCUC | $ 30 | | | | | | | | | | | |
| RTC15 | $ 32 | | $ 36 | | $ 34 | | $ 37 | | | | | |
| Rolling RTC | $ 40 | | $ 42 | | $ 32 | | $ 45 | | | | | |
| RTD | $ 60 | $ 55 | $ 38 | $ 36 | $ 39 | $ 37 | $ 35 | $ 20 | $ 31 | $ 42 | $ 38 | $ 30 |
| Unconst RTD | $ 60 | $ 55 | $ 38 | $ 36 | $ 39 | $ 37 | $ 35 | $ 20 | $ 31 | $ 42 | $ 38 | $ 30 |

| External Constraints | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| RTC15 | None | | | None | | | **Constraint** | | | None | | |
| Rolling RTC | None | | | None | | | **Constraint** | | | None | | |
| RTD | None | None | None | None | None | None | None | None | None | None | None | None |

| RT LBMPs | $ 60 | $ 55 | $ 38 | $ 36 | $ 39 | $ 37 | $ 32 | $ 30 | $ 31 | $ 42 | $ 38 | $ 30 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|

# RTM Pricing –
# Non-Competitive Pricing Rules

Pricing Rules for Non-Competitive Proxy Generator Buses when transactions are authorized to be scheduled hourly only:

- The rules below apply for determining Real-Time LBMPs at the HQ Chateauguay and HQ Cedars-Dennison Proxy Generator Buses

- When transactions at a Non-Competitive Proxy Generator Bus are authorized to be scheduled hourly only, and

  - $RTC_{15}$ has binding Proxy Generator Bus Constraints in the import direction:

    *Max($RTC_{15}$ LBMP, Min(unconstrained RTD LBMP, 0))*

  - $RTC_{15}$ has binding Proxy Generator Bus Constraints in the export direction:

    *Min($RTC_{15}$ LBMP, Max(unconstrained RTD LBMP, SCUC LBMP))*

  - NYCA Ramp Constraints are excluded from this rule

# RTM Pricing – Non-Competitive Pricing Examples

Pricing Rules for Non-Competitive Proxy Generator Buses (Examples):

- When transactions at a Non-Competitive Proxy Generator Bus are authorized to be scheduled hourly only

When transactions at a Non-Competitive Proxy Generator Bus are authorized to be scheduled hourly only, and RTC15 has binding Proxy Generator Bus Constraints in the import direction:

RT LBMP = Max(RTC15 LBMP, Min(unconstrained RTD LBMP, 0))

| LBMPs | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SCUC | $ 30 | | | | | | | | | | | |
| RTC15 | $ 20 | | | $ 36 | | | $ (5) | | | $ 37 | | |
| Rolling RTC | $ 40 | | | $ 42 | | | $ 37 | | | $ 45 | | |
| RTD | $ 60 | $ 55 | $ 38 | $ 36 | $ 39 | $ 37 | $ 35 | $ (3) | $ 40 | $ 42 | $ 38 | $ 30 |
| Unconst RTD | $ 60 | $ 55 | $ 38 | $ 36 | $ 39 | $ 37 | $ 35 | $ (3) | $ 40 | $ 42 | $ 38 | $ 30 |

| External Constraints | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| RTC15 | **Constraint** | | | **Constraint** | | | **Constraint** | | | **Constraint** | | |
| Rolling RTC | None | | | None | | | None | | | None | | |
| RTD | None | None | None | None | None | None | None | None | None | None | None | None |

| RT LBMPs | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| $ 20 | $ 20 | $ 20 | $ 36 | $ 36 | $ 36 | $ - | $ (3) | $ - | $ 37 | $ 37 | $ 37 | |

When transactions at a Non-Competitive Proxy Generator Bus are authorized to be scheduled hourly only, and RTC15 has binding Proxy Generator Bus Constraints in the export direction:

RT LBMP = Min(RTC15 LBMP, Max(unconstrained RTD LBMP, SCUC LBMP))

| LBMPs | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SCUC | $ 30 | | | | | | | | | | | |
| RTC15 | $ 45 | | | $ 36 | | | $ 41 | | | $ 37 | | |
| Rolling RTC | $ 40 | | | $ 42 | | | $ 37 | | | $ 45 | | |
| RTD | $ 60 | $ 55 | $ 38 | $ 36 | $ 39 | $ 37 | $ 35 | $ 20 | $ 40 | $ 42 | $ 38 | $ 30 |
| Unconst RTD | $ 60 | $ 55 | $ 38 | $ 36 | $ 39 | $ 37 | $ 35 | $ 20 | $ 45 | $ 42 | $ 38 | $ 30 |

| External Constraints | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| RTC15 | **Constraint** | | | **Constraint** | | | **Constraint** | | | **Constraint** | | |
| Rolling RTC | None | | | None | | | None | | | None | | |
| RTD | None | None | None | None | None | None | None | None | None | None | None | None |

| RT LBMPs | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| $ 45 | $ 45 | $ 38 | $ 36 | $ 36 | $ 36 | $ 35 | $ 30 | $ 41 | $ 37 | $ 37 | $ 30 | |

Enhanced Interregional Transaction Coordination

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# RTM Pricing –
# Non-Competitive Pricing Rules

Pricing Rules for Non-Competitive Proxy Generator Buses when transactions are authorized to be scheduled on a 5 minute basis:

- The rules below apply for determining Real-Time LBMPs at the HQ Chateauguay and HQ Cedars-Dennison Proxy Generator Buses

- When transactions at a Non-Competitive Proxy Generator Bus are authorized to be scheduled on a 5 minute basis, where the RTC15 that schedules hourly transactions was not constrained and

  - RTD has binding Proxy Generator Bus Constraints in the import direction
    - For NYCA Ramp, Interface TTC and/or Interface Ramp Constraints:

      *Max(RTD LBMP, Min(unconstrained RTD LBMP, 0))*

  - RTD has binding Proxy Generator Bus Constraints in the export direction
    - For NYCA Ramp, Interface TTC and/or Interface Ramp Constraints:

      *Min(RTD LBMP, Max(unconstrained RTD LBMP, SCUC LBMP))*

# RTM Pricing – Non-Competitive Pricing Examples

## Pricing Rules for Non-Competitive Proxy Generator Buses:

- When transactions at a Non-Competitive Proxy Generator Bus are authorized to be scheduled on a 5 minute basis

When transactions at a Non-Competitive Proxy Generator Bus are authorized to be scheduled on a 5 minute basis, and RTD has binding Proxy Generator Bus Constraints in the import direction:

RT LBMP = Max(RTD LBMP, Min(unconstrained RTD LBMP, 0))

| LBMPs | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SCUC | $ 30 | | | | | | | | | | | |
| RTC15 | $ 32 | | $ 36 | | $ 35 | | $ 37 | | | | | |
| Rolling RTC | $ 40 | | $ 42 | | $ 30 | | $ 45 | | | | | |
| RTD | $ 60 | $ 55 | $ 38 | $ 36 | $ 39 | $ 37 | $ 35 | $ 35 | $ 33 | $ 42 | $ 38 | $ 30 |
| Unconst RTD | $ 60 | $ 55 | $ 38 | $ 36 | $ 39 | $ 37 | $ 35 | $ 30 | $ 33 | $ 42 | $ 38 | $ 30 |

| External Constraints | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| RTC15 | None | | None | | None | | None | | | | | |
| Rolling RTC | None | | None | | None | | None | | | | | |
| RTD | None | None | None | None | None | None | None | **Const** | **Const** | None | None | None |

| RT LBMPs | $ 60 | $ 55 | $ 38 | $ 36 | $ 39 | $ 37 | $ 35 | $ 35 | $ 33 | $ 42 | $ 38 | $ 30 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|

When transactions a Non-Competitive Proxy Generator Bus are authorized to be scheduled on a 5 minute basis, and RTD has binding Proxy Generator Bus Constraints in the export direction

RT LBMP = Min(RTD LBMP, Max(unconstrained RTD LBMP, SCUC LBMP))

| LBMPs | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SCUC | $ 30 | | | | | | | | | | | |
| RTC15 | $ 32 | | $ 36 | | $ 34 | | $ 37 | | | | | |
| Rolling RTC | $ 40 | | $ 42 | | $ 49 | | $ 45 | | | | | |
| RTD | $ 60 | $ 55 | $ 38 | $ 36 | $ 39 | $ 37 | $ 35 | $ 48 | $ 28 | $ 42 | $ 38 | $ 30 |
| Unconst | $ 60 | $ 55 | $ 38 | $ 36 | $ 39 | $ 37 | $ 35 | $ 37 | $ 28 | $ 42 | $ 38 | $ 30 |

| External Constraints | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| RTC15 | None | | None | | None | | None | | | | | |
| Rolling RTC | None | | None | | None | | None | | | | | |
| RTD | None | None | None | None | None | None | None | **Const** | **Const** | None | None | None |

| RT LBMPs | $ 60 | $ 55 | $ 38 | $ 36 | $ 39 | $ 37 | $ 35 | $ 37 | $ 28 | $ 42 | $ 38 | $ 30 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|

Enhanced Interregional Transaction Coordination

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# RTM Pricing – Non-Competitive Pricing Rules

Pricing Rules for Non-Competitive Proxy Generator Buses and transactions are authorized to be scheduled on a 5 minute basis:

- The rules below apply for determining the Real-Time LBMPs at the HQ Chateauguay and HQ Cedars-Dennison Proxy Generator Buses

- When transactions at a Non-Competitive Proxy Generator Bus are authorized to be scheduled on a 5 minute basis, and

  - RTD and $RTC_{15}$ have the same binding Proxy Generator Bus Constraints in the import direction

    - For Interface TTC and/or Interface Ramp Constraints:

      *Max(Max($RTC_{15}$ LBMP, RTD LBMP), Min(unconstrained RTD LBMP, 0))*

    - For NYCA Ramp Constraints:

      *Max($RTC_{15}$ LBMP, Max(RTD LBMP, Min(unconstrained RTD LBMP, 0)))*

  - RTD and $RTC_{15}$ has binding Proxy Generator Bus Constraints in the export direction

    - For Interface TTC and/or Interface Ramp Constraints:

      *Min(Min($RTC_{15}$ LBMP, RTD LBMP), Max(unconstrained RTD LBMP, SCUC LBMP))*

    - For NYCA Ramp Constraints:

      *Min($RTC_{15}$ LBMP, Min(RTD LBMP, Max(unconstrained RTD LBMP, SCUC LBMP)))*

Enhanced Interregional Transaction Coordination

# RTM Pricing – Non-Competitive Pricing Examples

Pricing Rules for Non-Competitive Proxy Generator Buses (Examples):

- ◆ When transactions at a Non-Competitive Proxy Generator Bus are authorized to be scheduled on a 5 minute basis

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When transactions at a Non-Competitive Proxy Generator Bus are authorized to be scheduled on a 5 minute basis, and RTD and RTC15 have the same binding Proxy Generator Bus Interface TTC or Interface Ramp Constraint in the import direction:

RT LBMP = Max(Max(RTC15 LBMP, RTD LBMP), Min(unconstrained RTD LBMP, 0))

| LBMPs | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SCUC | $ 30 | | | | | | | | | | | |
| RTC15 | $ 32 | | | $ 36 | | | $ 20 | | | $ 37 | | |
| Rolling RTC | $ 40 | | | $ 42 | | | $ 30 | | | $ 45 | | |
| RTD | $ 60 | $ 55 | $ 38 | $ 36 | $ 39 | $ 37 | $ 35 | $ 28 | $ 19 | $ 42 | $ 38 | $ 30 |
| Unconst RTD | $ 60 | $ 55 | $ 38 | $ 36 | $ 39 | $ 37 | $ 35 | $ 33 | $ 27 | $ 42 | $ 38 | $ 30 |

| External Constraints | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| RTC15 | None | | | None | | | **Constraint** | | | None | | |
| Rolling RTC | None | | | None | | | None | | | None | | |
| RTD | None | None | None | None | None | None | None | **Const** | **Const** | None | None | None |

| RT LBMPs | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| RT LBMPs | $ 60 | $ 55 | $ 38 | $ 36 | $ 39 | $ 37 | $ 35 | $ 28 | $ 20 | $ 42 | $ 38 | $ 30 |

---

When transactions at a Non-Competitive Proxy Generator Bus are authorized to be scheduled on a 5 minute basis, and RTD and RTC15 have the same binding Proxy Generator Bus NYCA Ramp Constraint in the import direction

RT LBMP = Max(RTC15 LBMP, Max(RTD LBMP, Min(unconstrained RTD LBMP, 0)))

| LBMPs | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SCUC | $ 30 | | | | | | | | | | | |
| RTC15 | $ 32 | | | $ 36 | | | $ 20 | | | $ 37 | | |
| Rolling RTC | $ 40 | | | $ 42 | | | $ 30 | | | $ 45 | | |
| RTD | $ 60 | $ 55 | $ 38 | $ 36 | $ 39 | $ 37 | $ 35 | $ 28 | $ 19 | $ 42 | $ 38 | $ 30 |
| Unconst RTD | $ 60 | $ 55 | $ 38 | $ 36 | $ 39 | $ 37 | $ 35 | $ 33 | $ 27 | $ 42 | $ 38 | $ 30 |

| External Constraints | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| RTC15 | None | | | None | | | **Constraint** | | | None | | |
| Rolling RTC | None | | | None | | | None | | | None | | |
| RTD | None | None | None | None | None | None | None | **Const** | **Const** | None | None | None |

| RT LBMPs | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| RT LBMPs | $ 60 | $ 55 | $ 38 | $ 36 | $ 39 | $ 37 | $ 35 | $ 28 | $ 20 | $ 42 | $ 38 | $ 30 |

Enhanced Interregional Transaction Coordination

# RTM Pricing – Non-Competitive Pricing Examples

## Pricing Rules for Non-Competitive Proxy Generator Buses (Examples):

- When transactions at a Non-Competitive Proxy Generator Bus are authorized to be scheduled on a 5 minute basis

**When transactions at a Non-Competitive Proxy Generator Bus are authorized to be scheduled on a 5 minute basis, and RTD and RTC15 has binding Proxy Generator Bus Interface TTC or Interface Ramp Constraint in the export direction:**

RT LBMP = Min(Min(RTC15 LBMP, RTD LBMP), Max(unconstrained RTD LBMP, SCUC LBMP))

| LBMPs | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SCUC | $ 53 | | | | | | | | | | | |
| RTC15 | $ 32 | | | $ 36 | | | $ 54 | | | $ 37 | | |
| Rolling RTC | $ 40 | | | $ 42 | | | $ 49 | | | $ 45 | | |
| RTD | $ 60 | $ 55 | $ 38 | $ 36 | $ 39 | $ 37 | $ 35 | $ 99 | $ 60 | $ 42 | $ 38 | $ 30 |
| Unconst RTD | $ 60 | $ 55 | $ 38 | $ 36 | $ 39 | $ 37 | $ 35 | $ 55 | $ 45 | $ 42 | $ 38 | $ 30 |

| External Constraints | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| RTC15 | None | | | None | | | **Constraint** | | | None | | |
| Rolling RTC | None | | | None | | | None | | | None | | |
| RTD | None | None | None | None | None | None | None | **Const** | **Const** | None | None | None |

| RT LBMPs | $ 60 | $ 55 | $ 38 | $ 36 | $ 39 | $ 37 | $ 35 | $ 54 | $ 53 | $ 42 | $ 38 | $ 30 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|

**When transactions at a Non-Competitive Proxy Generator Bus are authorized to be scheduled on a 5 minute basis, and RTD and RTC15 have the same binding Proxy Generator Bus NYCA Ramp Constraint in the export direction:**

RT LBMP = Min(RTC15 LBMP, Min(RTD LBMP, Max(unconstrained RTD LBMP, SCUC LBMP)))

| LBMPs | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SCUC | $ 53 | | | | | | | | | | | |
| RTC15 | $ 32 | | | $ 36 | | | $ 54 | | | $ 37 | | |
| Rolling RTC | $ 40 | | | $ 42 | | | $ 49 | | | $ 45 | | |
| RTD | $ 60 | $ 55 | $ 38 | $ 36 | $ 39 | $ 37 | $ 35 | $ 99 | $ 60 | $ 42 | $ 38 | $ 30 |
| Unconst RTD | $ 60 | $ 55 | $ 38 | $ 36 | $ 39 | $ 37 | $ 35 | $ 55 | $ 45 | $ 42 | $ 38 | $ 30 |

| External Constraints | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| RTC15 | None | | | None | | | **Constraint** | | | None | | |
| Rolling RTC | None | | | None | | | None | | | None | | |
| RTD | None | None | None | None | None | None | None | **Const** | **Const** | None | None | None |

| RT LBMPs | $ 60 | $ 55 | $ 38 | $ 36 | $ 39 | $ 37 | $ 35 | $ 54 | $ 53 | $ 42 | $ 38 | $ 30 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|

Enhanced Interregional Transaction Coordination

# Next Steps

- <span style="color:blue">May 24, 2010 – Presented pricing proposal at MIWG</span>

- <span style="color:blue">June 7, 2010 – Present pricing examples at MIWG</span>

- Begin developing tariff language for discussion at MIWG in June

- 2010 – Stakeholder Approval Process, begin implementation of Phase 1

  - Phase 1 – Begin with scheduling intra-hour dispatchable energy transactions between the NY and HQ control areas

- Q1 2011 – Complete Implementation of Phase 1

- Continue to work with HQ and PJM on implementation details

# Appendix

# General Concept – Bidding

## Bidding

- Intra-hour import/export transactions will be bid into the MIS similarly to the way hourly import/export transactions are bid
    - Transactions bids will still be bid and evaluated for a full hour
    - MPs shall indicate on each bid whether the transaction should be scheduled as an hourly or intra-hour transaction in the Real-Time Market
    - Wheel-through transaction offers will <u>not</u> have the option to be scheduled as an intra-hour transaction
    - All proxy buses will continue to be authorized for hourly scheduling, even those that are authorized for intra-hour scheduling
- The Real-Time Market bidding window will remain the same for hourly and intra-hour transactions
    - All transaction bids are still required to be submitted for evaluation by RTC and/or RTD no later than 75 minutes before each hour

# General Concept – Bidding

## Bidding (cont.)

- All external transaction bids will support an 11 point incremental/decremental cost curve and energy MW offer
  - Today, transaction bids only support a single incremental/decremental cost and energy MW
  - The energy MW will be treated as the maximum allowable schedule for the transaction
  - The cost curves will be allowed to extend beyond the energy MW offered for the transaction
  - Cost curves associated with export transactions will be treated as price capped cost curves, which is similar to the way virtual load bids are treated

Enhanced Interregional Transaction Coordination

# General Concept – Bidding

## HAM Bid Curve Logic

- Today, we allow MPs to provide an optional HAM price on the DAM Bid or we use a default price when we convert an accepted DAM schedule into a HAM bid

- With an 11 point curve there can be times when the curve copied from the DAM bid will need to be modified when creating the HAM bid

- The NYISO proposes using the following rules for creating the HAM bid:
  - If a HAM bid already exists, the existing HAM bid will <u>not</u> be modified
  - When carrying the DAM schedule forward onto the HAM bid, merge the bid curve on the DAM bid with either the optional HAM price (as provided on the DAM bid) or to the HAM default price for DAM scheduled transactions (-$0.01 for imports/wheels, $999.70 for exports)
  - Create a new point on the HAM bid curve with the DAM schedule and opted price (optional HAM price/default price)
  - When inserting the new point on the bid curve there the new bid curve may no longer be monotonically increasing
  - To address the above issue, points above or below the inserted point will be removed to maintain a monotonically increasing bid curve
  - If necessary, a 12th point can be added to the HAM bid curve

  - Set the Energy Profile MW on the HAM bid to the DAM schedule
  - There is still an opportunity to adjust the HAM bid curve up to 75 minutes prior to the hour

# General Concept – Bidding

## Bidding Import/Wheel Example 1

DAM Energy Profile MW = 100

Confirmed DAM Sched = 20

Optional HAM $ = $20

DAM Curve Pt 1 = 10MW, $10

DAM Curve Pt 2 = 30MW, $30

DAM Curve Pt 3 = 50MW, $50

DAM Curve Pt 4 = 100MW, $100

HAM Energy Profile MW = 20

HAM Curve Pt 1 = 10MW, $10

HAM Curve Pt 2 = 20MW, $20

HAM Curve Pt 3 = 30MW, $30

HAM Curve Pt 3 = 50MW, $50

HAM Curve Pt 4 = 100MW, $100

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# General Concept – Bidding

## Bidding Import/Wheel Example 2

DAM Energy Profile MW = 100

Confirmed DAM Sched = 20

Optional HAM $ = $40

DAM Curve Pt 1 = 10MW, $10

DAM Curve Pt 2 = 30MW, $30

DAM Curve Pt 3 = 50MW, $50

DAM Curve Pt 4 = 100MW, $100

HAM Energy Profile MW = 20

HAM Curve Pt 1 = 10MW, $10

HAM Curve Pt 2 = 20MW, $40

~~HAM Curve Pt 3 = 30MW, $30~~

HAM Curve Pt 3 = 50MW, $50

HAM Curve Pt 4 = 100MW, $100

# General Concept – DAM Scheduling

## Day-Ahead Market (DAM) Scheduling

- No changes expected to the treatment of transactions in the Day Ahead Market

- Continue to allow external DAM Market transaction bids to be evaluated by SCUC on an hourly basis

- The evaluation of all transactions will continue to be based on the NYISO ex-ante LBMPs

- External DAM LBMP Market transactions will continue to be settled based on DAM LBMPs and DAM Schedules

# General Concept – NERC e-Tag Requirements

- The NERC e-Tag duration must be at least one hour
- The NERC e-Tag start/stop time must be the beginning of an hour
  - For example, the start time must be XX:00
  - This means a start or stop time of anything other than XX:00 will not be approved
- For intra-hour transactions submitted at those Proxy Generator Buses where intra-hour transactions are authorized to be scheduled on a 15 minute basis:
  - The NERC e-Tag should have its Transaction Type set to 'Normal'
    - This is no different than today
  - The NERC e-Tag Energy Profile MW may be updated on a 15 minute basis, where the NERC Security Coordinators must approve the NERC e-Tag prior to implementation of the interchange
    - This will be accomplished through a Transaction Checkout process that occurs on a 15 minute basis
- For intra-hour transactions submitted at those Proxy Generator Buses where intra-hour transactions are authorized to be scheduled on a 5 minute basis:
  - The NERC e-Tag should have its Transaction Type set to 'Dynamic'
  - The maximum expected energy should be set equal to the Energy Request (MW) bid into the MIS
  - The actual interchange value will be updated as soon as possible after the dispatch hour is complete
- Hourly transactions shall have its NERC e-Tag Transaction Type set to 'Normal'
  - This is no different than today

# General Concept – RTM Scheduling

## Transaction Scheduling

- Allow external hourly transaction bids to be economically evaluated by $RTC_{15}$ on an hourly basis, as is currently done
  - Wheel-through transactions will only be evaluated by $RTC_{15}$ on an hourly basis
- At those Proxy Generator Buses where intra-hour transactions are authorized, external intra-hour transaction bids will be economically evaluated by RTC on a rolling 15 minute basis
- At those Proxy Generator Buses where intra-hour transactions are authorized to be scheduled on a 5 minute basis, external intra-hour transaction bids will be economically evaluated by RTD on a rolling 5 minute basis
  - RTD-CAMs could also evaluate intra-hour transaction bids when a CAM is requested

# General Concept – RTM Scheduling

## Transaction Checkout & Curtailments

- At those Proxy Generator Buses where intra-hour transactions are authorized to be scheduled on a 5 minute basis, intra-hour transactions will be subject to an hourly checkout
  - This Checkout (from xx:30 – xx:40) will (1) adjust hourly transactions and commit the schedule for the hour, and (2) confirm the max energy profile for intra-hour transactions for use by subsequent RTC and RTD evaluations
- At those Proxy Generator Buses where intra-hour transactions are authorized to be scheduled on a 15 minute basis, intra-hour transactions will be subject to a 15 minute checkout
  - The 15 minute checkout would occur at least 20 minutes before the quarter hour in which schedule is implemented
  - The RT Checkout from xx:30 – xx:40 will (1) adjust hourly transactions and commit for the hour, and (2) adjust the intra-hour transactions and commit for the next 15 minute period
  - The RT Checkout from xx:45 – xx:55, xx:00 – xx:10, xx:15 – xx:25 will only adjust the intra-hour transactions and commit for the next 15 minute period
- All Real-Time Market transactions are subject to reliability curtailments

# General Concept – RTM Scheduling
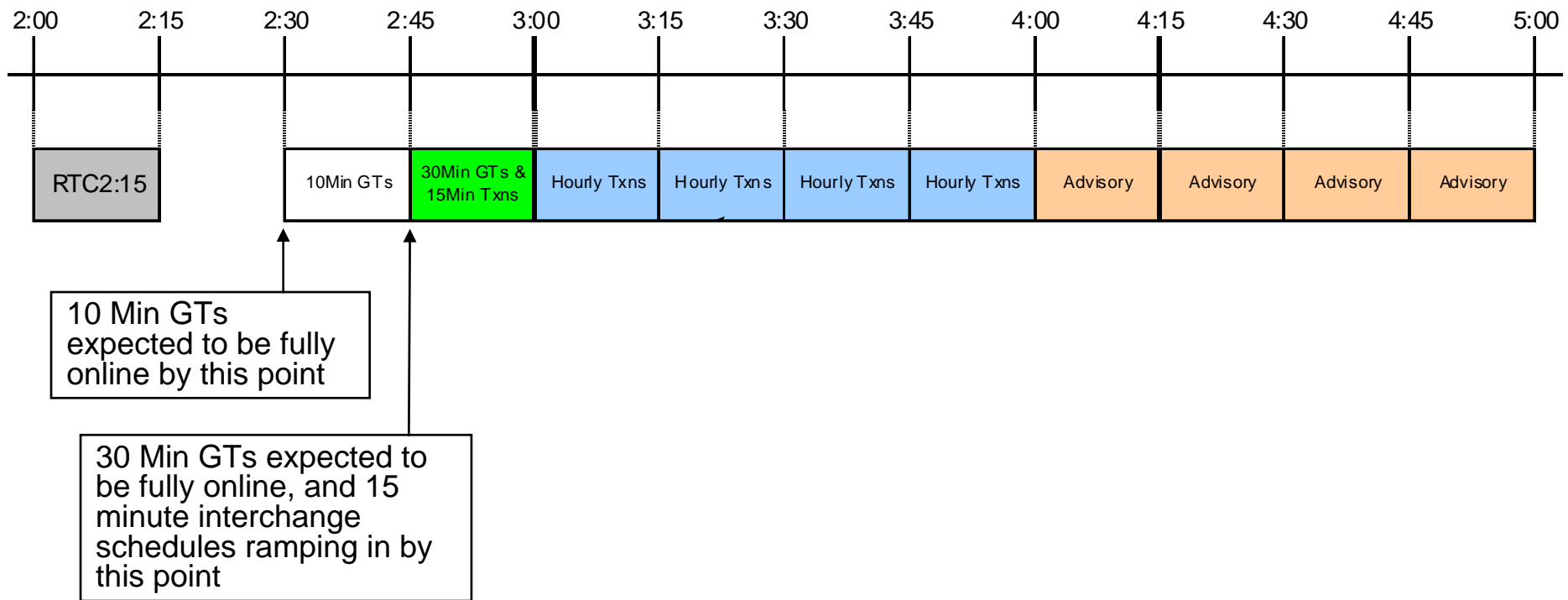
**EVALUATION OF EXTERNAL TRANSACTIONS**

| | DAY AHEAD | REAL-TIME | |
|---|---|---|---|
| | SCUC | RTC | RTD |
| **MULTI-HOUR BLOCK TRANSACTIONS***<br>**(IMPORT/EXPORT/WHEEL-THROUGH)** | Block Schedule for a Minimum Run Time | Treated as hourly or intra-hour depending on MP preference | Treated as hourly or intra-hour depending on MP preference |
| **HOURLY TRANSACTIONS***<br>**(IMPORT/EXPORT/WHEEL-THROUGH)** | Schedule does not vary within the hour, and may change from hour to hour | Schedule does not vary within the hour, and may change from hour to hour | Schedule does not vary within the hour, and may change from hour to hour** |
| **INTRA-HOUR TRANSACTIONS***<br>**(IMPORT/EXPORT ONLY)** | Not Applicable | Schedule may change every fifteen minutes | Schedule may change every five minutes** |

*Schedules based on economic evaulation
**Subject to reliability curtailments in real-time

# General Concept – RTM Scheduling

Starting with RTC that posts at 2:15

| 2:00 | 2:15 | 2:30 | 2:45 | 3:00 | 3:15 | 3:30 | 3:45 | 4:00 | 4:15 | 4:30 | 4:45 | 5:00 |
|------|------|------|------|------|------|------|------|------|------|------|------|------|

| RTC2:15 | | 10Min GTs | 30Min GTs & 15Min Txns | Hourly Txns | Hourly Txns | Hourly Txns | Hourly Txns | Advisory | Advisory | Advisory | Advisory |

10 Min GTs expected to be fully online by this point

30 Min GTs expected to be fully online, and 15 minute interchange schedules ramping in by this point

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# General Concept – RTM Scheduling

Moving to RT Checkout & RTC that posts at 2:30

| 2:00 | 2:15 | 2:30 | 2:45 | 3:00 | 3:15 | 3:30 | 3:45 | 4:00 | 4:15 | 4:30 | 4:45 | 5:00 | 5:15 |

| | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| RTC2:15 | | | 10Min GTs | 30Min GTs & 15Min Txns | Hourly Txns | Hourly Txns | Hourly Txns | Hourly Txns | Advisory | Advisory | Advisory | Advisory | |

CO 15Min Txns

| RTC2:30 | | | 10Min GTs | 30Min GTs & 15Min Txns | Advisory | Advisory | Advisory | Advisory | Advisory | Advisory | Advisory | Advisory |

15 minute interchange transaction schedules for the 2:45 to 3:00 quarter hour to be confirmed with external Control Areas by this point
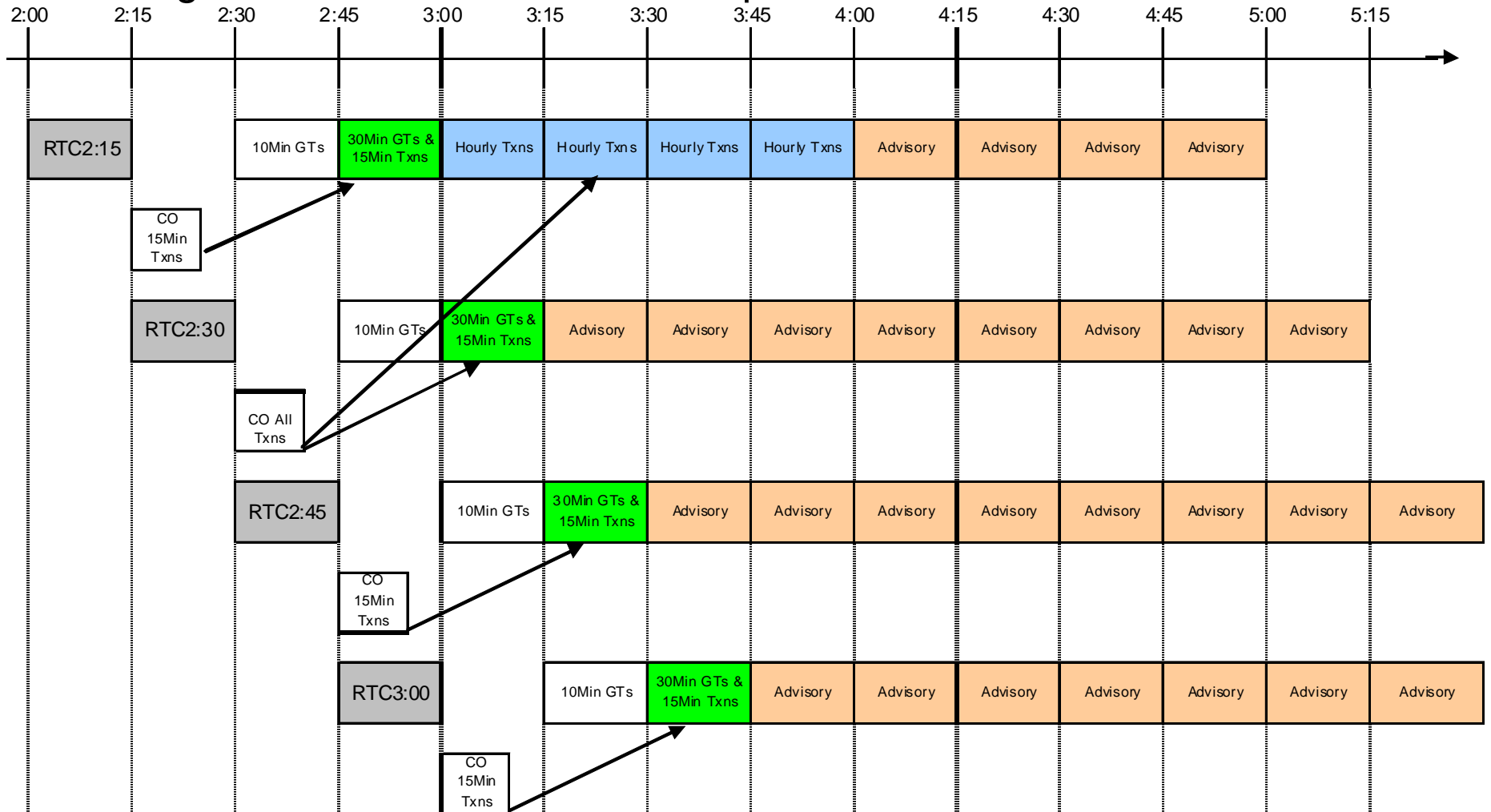
# General Concept – RTM Scheduling

Moving to RT Checkout & RTC that post at 2:45

Hourly interchange transaction schedules and 5 minute interchange transactions for the 3:00 hour, and 15 minute interchange transaction schedules for the 3:00 to 3:15 quarter hour to be confirmed with external Control Areas by this point

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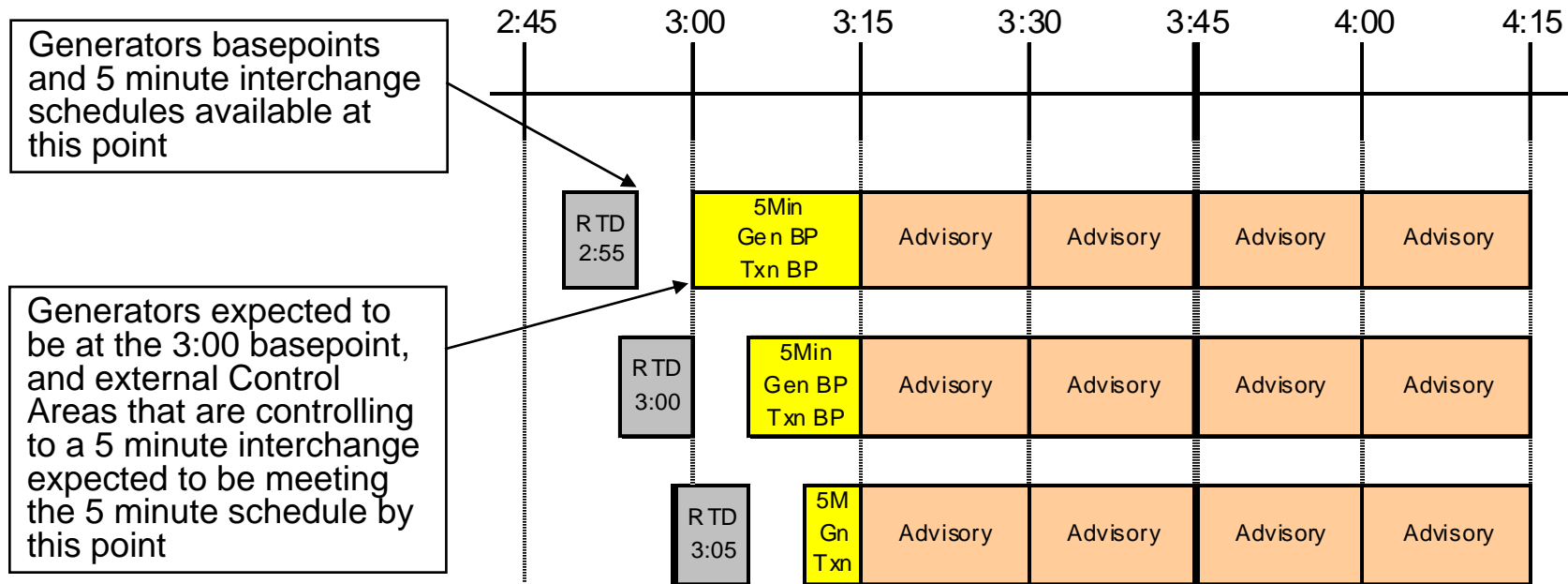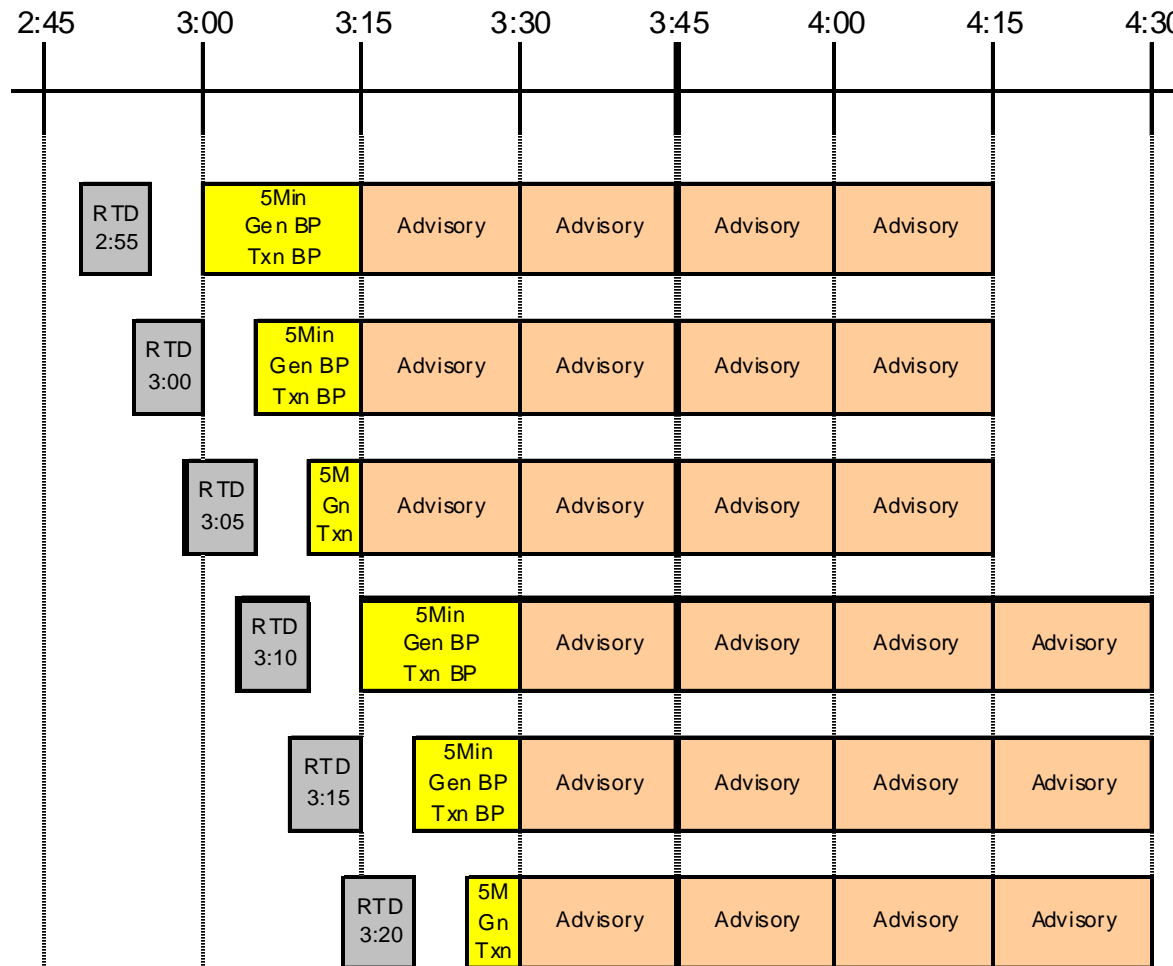
# General Concept – RTM Scheduling

Moving to RT Checkout & RTC that posts at 3:00
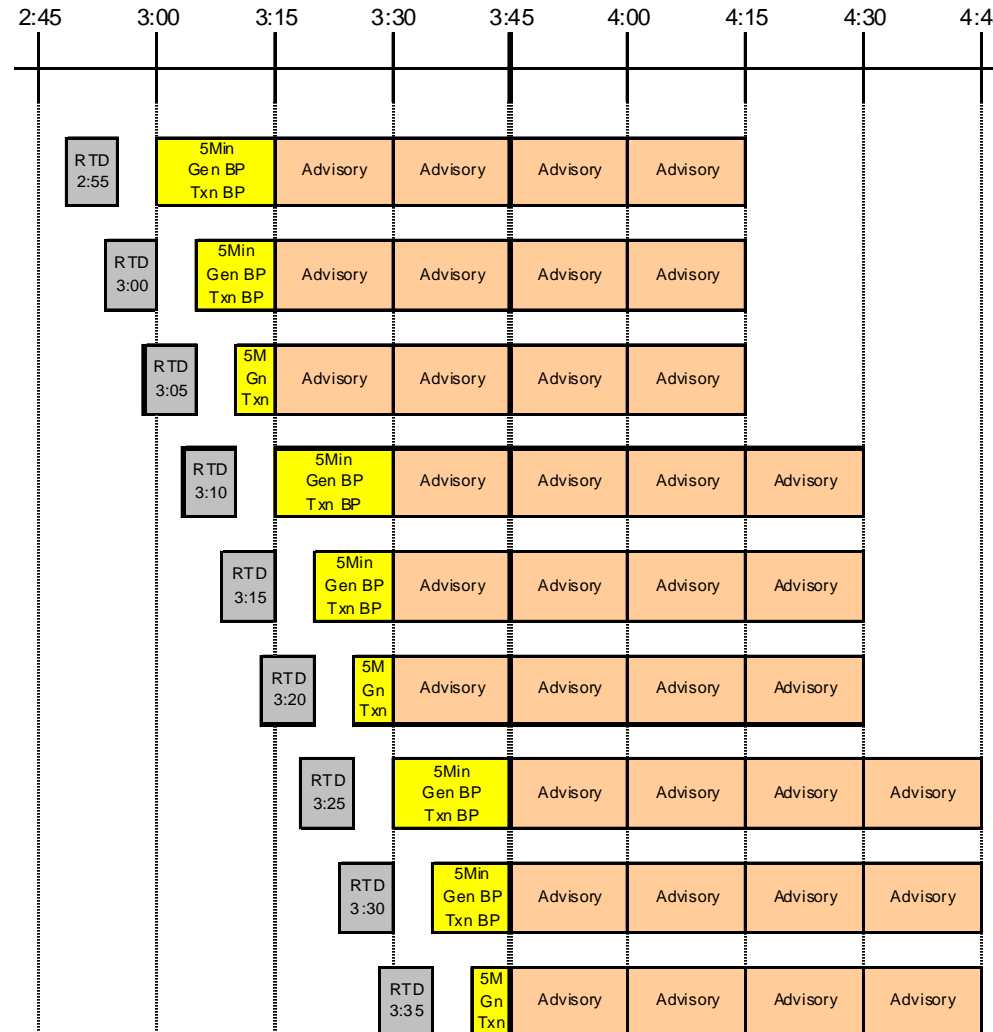
# General Concept – RTM Scheduling

Moving to RTD that posts at 2:55, 3:00, and 3:05

| | 2:45 | 3:00 | 3:15 | 3:30 | 3:45 | 4:00 | 4:15 |

Generators basepoints and 5 minute interchange schedules available at this point

Generators expected to be at the 3:00 basepoint, and external Control Areas that are controlling to a 5 minute interchange expected to be meeting the 5 minute schedule by this point

RTD 2:55 | 5Min Gen BP Txn BP | Advisory | Advisory | Advisory | Advisory

RTD 3:00 | 5Min Gen BP Txn BP | Advisory | Advisory | Advisory | Advisory

RTD 3:05 | 5M Gn Txn | Advisory | Advisory | Advisory | Advisory

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Moving to RTD that posts at 3:10, 3:15, and 3:20



Timeline markers: 2:45, 3:00, 3:15, 3:30, 3:45, 4:00, 4:15, 4:30

| RTD 2:55 | 5Min Gen BP Txn BP | Advisory | Advisory | Advisory | Advisory |
| RTD 3:00 | 5Min Gen BP Txn BP | Advisory | Advisory | Advisory | Advisory |
| RTD 3:05 | 5M Gn Txn | Advisory | Advisory | Advisory | Advisory |
| RTD 3:10 | 5Min Gen BP Txn BP | Advisory | Advisory | Advisory | Advisory |
| RTD 3:15 | 5Min Gen BP Txn BP | Advisory | Advisory | Advisory | Advisory |
| RTD 3:20 | 5M Gn Txn | Advisory | Advisory | Advisory | Advisory |

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# General Concept – RTM Scheduling

Moving to RTD that posts at 3:25, 3:30, and 3:35

# General Concept – RTM Scheduling

Finally, moving to RTD that posts at 3:40, 3:45, and 3:50)
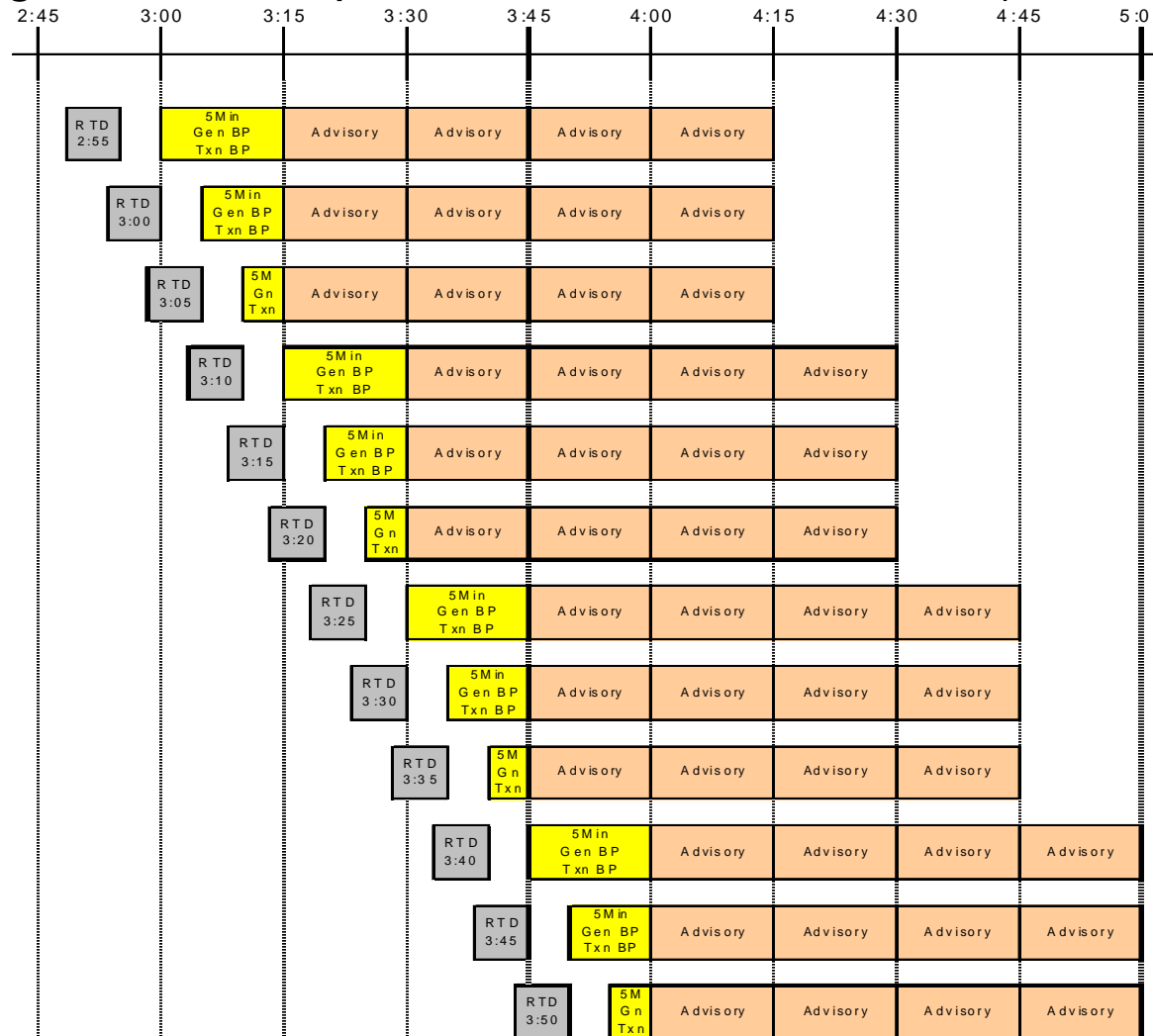
# General Concept – RTM Settlement

Real-Time Market (RTM) Settlement

- The Real-Time LBMPs for all Real-Time Market transactions will be based on the RTD LBMPs unless the Pricing Rules for Proxy Generator Buses, Rules for Non-Competitive Proxy Generator Buses or Special Pricing Rules for Scheduled Lines are invoked

- External transactions will be settled based on Real-Time Market LBMPs and Real-Time Schedules

- For external import bilateral transactions that choose to schedule energy via an intra-hour transaction, the LBMP settlement will be based on the Real-Time Market 5 or 15 minute intra-hour transaction scheduling outcome
  - The TUC settlement calculation will capture the Real-Time Market 5 or 15 minute transaction schedule changes for external import and export bilateral transactions

- All intra-hour import transactions (5 minute or 15 minute scheduled transactions) will be eligible for RT BPCG
  - Hourly import transactions bid at a Proxy Generator Bus **with** intra-hour transaction scheduling capability will no longer be eligible for RT BPCG
  - Hourly import transactions bid at a Proxy Generator Bus **without** intra-hour transaction scheduling capability will continue to be eligible for RT BPCG

# General Concept – RTM Settlement

Import Curtailment Guarantees

◆ Propose to base the settlement on the DAM schedule

▪ Applied on an interval by interval basis, then rolled up to the hour

◆ All import transactions (hourly and intra-hour) will continue to be eligible for Import Curtailment Guarantees when:

▪ The HAM Transaction Offer MW remains equal to or greater than the DAM Schedule, and

▪ The HAM Transaction Energy Curve is set to or below the default economic priority (-$0.01) for the MWs scheduled in the DAM

▪ The HAM Transaction was curtailed for NYISO reliability outside of the market evaluation

# General Concept – RTM Settlement

Import Curtailment Guarantees

- ◆ Settlement Example

  *DAM Schedule = 50MW, DAM Bid = $20/MWh, DAM LBMP = $50/MWh*

  *RT Schedule = 20MW, RT LBMP = $80/MWh*

  DAM Settlement = DAM Revenues – DAM Bid

  = DAM Schedule*(DAM LBMP - Max(DAM Bid,0))

  = $1,500

  RT Settlement with DAM Schedule = (RT Schedule – DAM Schedule) * RT LBMP

  = -$2,400

  Import Curtailment Guarantee = (DAM Schedule – RT Schedule) *

  (RT LBMP – Max(DAM Bid,0))

  = $1,800

Enhanced Interregional Transaction Coordination

# General Concept – RTM Settlement

Financial Impact Charges

- The Financial Impact Charge (FIC) will continue to apply to transactions scheduled at Proxy Generator Buses with intra-hour transaction scheduling capability
  - The FIC will only apply to transactions that receive a non-zero schedule from RTC for any part of the hour
  - The FIC will be assessed for external transactions on an interval by interval basis as:

    For Imports: Max((RTC Schedule – RT Schedule)*[Max((RT LBMP – RTC LBMP),0),0)
    For Exports: Max((RTC Schedule – RT Schedule)*[Max((RTC LBMP – RT LBMP),0),0)
    For Wheel-Throughs: Assessed as both a failed import and failed export

  - The RTC LBMP will be the LBMP that was used to schedule the transaction
    - For Hourly Transactions, the RTC LBMP will be the four LBMPs out of the $RTC_{15}$ evaluation
    - For Intra-hour Transactions (evaluated either on a 15 minute and 5 minute basis), the RTC LBMP will be the LBMP from the rolling RTC that provided a schedule for the transaction.

# HQ-NY Specifics

- Intra-hour transactions will be evaluated by the Real-Time Market on a 5 minute basis
- The 10 minute top of the hour (from xx:55 to x1:05) DNI ramp with HQ will continue to be 70MW/min (700MW total over 10 minutes)
- The rest of the hour DNI ramp with HQ (remaining 50 minutes from x1:05 to x1:55) would be limited to 20MW/min (100MW over 5 minutes) initially
- No other ramp requirements will be necessary in RTD
  - Instead RTD will be provided with the RTC look ahead DNI for external transaction scheduling purposes
- The Desired Net Interchange (DNI) with HQ would be exchanged using automated ICCP communication
  - Similar to providing a Generator a 5 minute base point

# PJM-NY Specifics & Status

- ## Specifics

  - Intra-hour transactions will be evaluated by the Real-Time Market on a 15 minute basis

  - Expect to rollout 15 minute transaction scheduling to
    1. *The Linden VFT proxy bus*
    2. *The Neptune proxy bus*
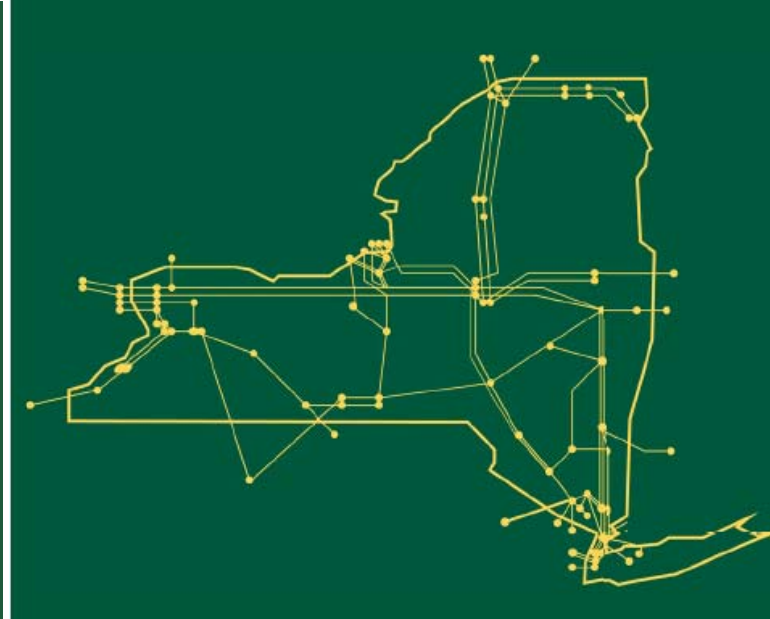    3. *The Keystone proxy bus*

- ## Status

  - PJM has a constraint that requires a transaction to flow for at least 45 minutes once it is selected
    - This is no longer an issue, as schedule changes generated by the NYISO are not subject to this constraint
    - This constraint is enforced by PJM on traders that try to schedule an e-Tag that starts during the hour

# Next Steps

- June 26, 2009 – Introduced the concept to MIWG
- September 1, 2009 – Presented proposal to MIWG
- September 29, 2009 – Presented proposal to SOAS
- October 21, 2009 – Presented proposal to the BIC for discussion
- December 10, 2009 – Presented proposal to the OC for discussion
- December 17, 2009 – Introduced PJM-NY Concept at MIWG
- January 5, 2010 – Presented proposal at MIWG
- January 26, 2010 – Presented proposal to SOAS
- March 9, 2010 – Presented proposal at MIWG
- May 13, 2010 – Continue proposal discussions at MIWG
- May 24, 2010 – Present pricing proposal at MIWG
- 2010 – Stakeholder Approval Process, begin implementation of Phase 1
- Q1 2011 – Complete Implementation of Phase I

Enhanced Interregional Transaction Coordination

The New York Independent System Operator (NYISO) is a not-for-profit corporation that began operations in 1999. The NYISO operates New York's bulk electricity grid, administers the state's wholesale electricity markets, and conducts comprehensive planning for the state's bulk electricity system.

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